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tinuously applied for a long time, of the material composing the outer part of the earth. A flowage of rocks, of the character referred to in Professor Chamberlin's review, may be one of the ways in which the material yields to forces continuously applied for a long time, even though those forces are not sufficiently great to produce motion if applied for a short time only.

Professor Chamberlin has, in the curve *C-C*, furnished a statement of the manner of distribution of the isostatic compensation with respect to depth corresponding to the accretion hypothesis. Since writing this review, Professor Chamberlin has been assured that a sub-solution upon that basis will be added to the geodetic investigation before the final publication is made.

JOHN F. HAYFORD

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The Geology of South Africa. By F. H. HATCH and G. S. CORSTROPHINE. London and New York: The Macmillan Co., 1905. Pp. 348, 2 maps, 89 figures.

The authors have attempted in this work to put within the limits of a small volume the essentials of the geology of South Africa. Their long experience in South African geology, both in the Transvaal and Cape Colony, has fitted them well for their task. The literature of South African geology is especially burdened with a great mass of semi-scientific writings which deal with isolated areas, without any attempt at correlation with neighboring regions, and only recently by the work of the Cape Colony and Transvaal surveys, has geological work been carried to a stage that would warrant the treatment of South Africa as a unit. The book contains some details that were hardly intended for the student so far away as America, and, on the other hand, many general points of vital interest are passed over all too briefly. This is especially true of the physical history and dynamical problems of the region. Nevertheless, the volume is a valuable and welcome summary of the geology of this distant land.

The "pre-Karoo" (pre-Permo-Carboniferous) rocks are treated in two sections: Section I describes those of south Cape Colony; Section II those of the Transvaal and neighboring regions. At the base, in both regions, is a series of micaceous slates and quartzites with occasional conglomerates and crystalline limestones, into which were intruded granite

masses, causing considerable metamorphism, and resulting in a great variety of schists. This series is classed as Archean.

The great group of rocks resting unconformably on the Archean, and below the Cape System (the upper part of the pre-Karoo group), has not yet been correlated with the formations of other countries. They consist of slates, quartzites, grits, conglomerates, and dolomites. In the Transvaal the group has a thickness of 35,000–40,000 feet, and includes three unconformable systems; the lower one of which, the Witwatersrand, consists of twelve formations and has a thickness of 20,000 feet. The conglomerate beds of the Witwatersrand contain valuable gold deposits, having an output, in 1904, of about \$70,000,000. The second system of the group is largely volcanic; the third is made up of clastics and dolomites.

The Cape system consists in its best development (south Cape Colony) of three conformable series of slates, quartzites, shales, and sandstones. The middle series, the Bokkeveld, contains the oldest recognizable fossils found in South Africa. They are of Devonian age.

The "Karoo system" is a conformable series beginning with Permo-Carboniferous strata, and extending to the end of the Triassic. The system has a thickness of about 20,000 feet, and is composed of sandstones, shales, and conglomerates. It outcrops in an elliptical north-east-to-southwest area covering three-fourths of South Africa. In south Cape Colony it rests conformably upon the Cape system, but elsewhere it is unconformable on older rocks. At the base of the system is the Dwyka glacial conglomerate of Permian age.

The "Coastal system" (Cretaceous) consists of two series occurring in different regions; one is of Lower, the other of Upper Cretaceous age.

Post-Cretaceous beds are represented by superficial deposits, usually cemented, which probably range from Tertiary to quite recent, but in the absence of fossils they are not classified.

The igneous rocks of known age are discussed along with the sedimentary series and chap. i of Part IV treats some volcanic rocks of doubtful stratigraphical position.

Chap. ii of Part IV is devoted to the occurrence and origin of the diamond bearing deposits.

In Part V the authors discuss the correlations of the strata of the various regions of South Africa and their position in the geological column. The correlation tables here and in other parts of the book are especially valuable.

The chief subdivisions are here reproduced.

CORRELATION TABLE OF SOUTH AFRICAN STRATA

European Equivalents	Southern Cape Colony	Northern Cape Colony	Natal	Transvaal
	Superficial Deposits	Superficial Deposits	Superficial Deposits	Superficial Deposits
Cretaceous..	Coastal System { Umtamvuna Series Uitenhage Series		Coastal System { Umtamvuna Series	
Rhaetic				
Permo-Carboniferous.	Karoo System { Stormberg Series Beaufort Series Ecca Series	Karoo System { Ecca Series	Karoo System { Stormberg Series Beaufort Series Ecca Series	Karoo System { Ecca Series
Devonian ..	Cape System Congo System Ibiquas ?	Cape System Griqualand System Amygdaloids of the Vaal River	Cape System	Waterberg System Potchefstroom System Ventersdorp System Witwatersrand System
Archean	Malmesburg System	Namaqualand System	Swaziland System	Swaziland System

J. E. C.

New York State Museum, Bulletin 99. Geologic Map of the Buffalo Quadrangle. By D. D. LUTHER, 1906. Pp. 29 and geologic map.

This bulletin is the latest one, prepared under the direction of Dr. John M. Clarke and published by the New York State Museum, devoted to the mapping and description of the geologic formations of a quadrangle. As is customary with this series of bulletins, it contains a map on which the areal distribution of the various formations is shown, accompanied by a text giving an account of their occurrence and characters together with lists of their common and diagnostic fossils. As stated by Dr. Clarke, "students of geology in Buffalo will find the map and its accompanying text a detailed guide to the rock sections of the region and to the scattered and often obscure outcrops of the formations, and, since this is the second largest city in the state, the bulletin will be of special service to a large number of people.

The strata composing the surface rocks of this quadrangle have an aggregate thickness of over 800 feet and are of Devonian age, with the